

REMARKS

Claims 1-11 are currently pending in the present application, with claims 1-2, 4-6, and 8-11 being amended. Reconsideration and reexamination of the claims, as amended, are respectfully requested.

The present invention is directed to a process apparatus that includes a baffle plate having slits with an inner surface that is tapered. The baffle plate separates the process chamber and the exhaust passage, allowing the exhaust gas to travel from the process chamber to the exhaust passage through the slits. With respect to amended Claims 1-4, the tapered surface is formed such that the depth of the tapered surface is more than a 1/4 of the thickness of the baffle plate, and is formed such that the opening of the slit facing the process chamber is larger than the opening facing the exhaust passage. As Figures 5-7 of the present application illustrate, the claimed invention provides an important advantage over the conventional baffle plates in that the slit openings of the claimed invention is able to minimize the residue built up around the openings of the slits, allowing more plasma gas exhaust to pass through the baffle plate over a longer period of time. Figure 7 of the present application graphically illustrates one of the advantages of present invention wherein the pressure atmosphere in the process chamber of the present invention can be maintained in an optimal condition for much longer periods of time than can a process chamber using a convention baffle plate. As a result, the baffle plate of the claimed invention requires less regular cleaning or replacement, thereby reducing the maintenance cost of operating the process apparatus.

Claims 5-11 are directed to a modification of the preferred embodiment of the present invention. Specifically, each slit of the baffle plate has a tapered surface sloping from the slit opening that faces the process chamber, and a non-tapered surface formed from the slit opening that faces the exhaust passage. The depth of the tapered surface and the depth of the non-tapered surface are no greater than 1/2 of the thickness of the baffle plate.

The Examiner rejected Claims 1-11 under 35 U.S.C. 102(b) as been anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being obvious over Cho et al. (U.S. Patent No. 5,441,568). This rejection is respectfully traversed with respect to the amended claims.

Cho discloses an exhaust baffle plate whereby the apertures on the plate are placed across the baffle plate so as to purportedly increase the effective range of the plenum situated below the plate. With respect to Claims 1-4, Cho does not disclose baffle plate having slits with a tapered inner surface such that the opening facing the process chamber is larger than the opening facing the exhaust passage (as claimed in amended Claim 1). Furthermore, Cho does not disclose a baffle plate having slit openings whereby different inner surfaces of each opening is formed. Specifically, Cho does not disclose or suggest slits on a baffle plate having a process-chamber opening and a exhaust-passage opening, wherein the process-chamber opening has a tapered surface having a depth not more than 1/2 thickness of the baffle plate, and wherein the exhaust-passage opening has a surface perpendicular to the horizontal plane of the baffle plate (as claimed in amended Claim 5).

Rather, Cho simply disclose forming apertures on a baffle plate at an acute angle relative to the center of the plate. The purpose of the forming aperture in an inclined manner in Cho is simply to disperse the exhaust gas in a more evenly fashion; nothing in Cho provides motivation for reducing the residual built up on the slit openings of a baffle plate. Accordingly, Applicants respectfully submit that amended Claims 1-11 are not anticipated by, nor obvious in view of, Cho.

The Examiner rejected Claims 1-11 under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being obvious over Su (U.S. Patent No. 5,589,002). This rejection is respectfully traversed with respect to the amended claims.

Su discloses a gas distribution plate whereby the slit openings of the plate extend radially outward from the center of the plate. The slit openings in Su are formed with parallel tapered surfaces so as to form an identical angle with respect to the horizontal surface of the plate.

Figure 7 of Su illustrates the slits formed at an slanted angle extending away from the center of the plate. Su does not disclose forming slits on a baffle plate having a tapered inner surface such that the opening of the slit facing the process chamber is larger than the opening facing the exhaust passage (as claimed in amended Claim 1). Furthermore, Su does not disclose or suggest slits on a baffle plate having a process-chamber opening and a exhaust-passage opening, wherein the process-chamber opening has a tapered surface having a depth not more than 1/2 thickness of the baffle plate, and wherein the exhaust-passage opening has a surface perpendicular to the horizontal plane of the baffle plate (as claimed in amended Claim 5). Accordingly, Applicants respectfully submit that amended Claims 1-11 are not anticipated by, nor obvious in view of, Su.

In view of the foregoing, Applicants respectfully submit that amended Claims 1-11 are in condition for allowance. The entry of the instant amendment after final is respectfully requested. Reconsideration and reexamination of the claims, as amended, are respectfully requested and an early allowance is solicited. If the Examiner feels that it would advance the prosecution of the present application, it is respectfully requested that he telephone the undersigned attorney.


Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 285032005800.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1-2, 4-6, and 8-11 were amended in the following manner:

1. (Amended) A process apparatus including an airtight process vessel, an exhaust system for exhausting gas from the process vessel, and a baffle plate for partitioning the process vessel into a process chamber for processing an object and an exhaust passage communicating with the exhaust system,

wherein the baffle plate [has] includes a plurality of slits through which the process chamber and the exhaust passage communicate with each other[;],

[each slit has a] wherein the inner surface of each slit is tapered, said tapered [surface on an inner surface toward the process chamber, the tapered] surface being formed to having a depth not less than 1/4 of [a depth of the slit; and] the thickness of the baffle plate,

wherein for each slit the opening facing the process chamber is larger than the opening facing the exhaust passage, and

wherein for each slit an angle θ formed between the tapered surface and [a] an axis perpendicular [crossing an open end] to the openings of the slit [at right angles] falls within a range from 5° to 30° [$(5^\circ \leq \theta \leq 30^\circ)$].

2. (Amended) The process apparatus according to claim 1, wherein the depth of the tapered surface is formed to not less than 1/2 of the depth of the [slit] thickness of the baffle plate.

4. (Amended) The process apparatus according to claim [2] 1, wherein each slit extends in a radial direction of the baffle plate[, and the tapered surface extends in the radial direction of the baffle plate on either side of the slit and inclines from an opening rim of the slit, which faces the process chamber, toward the exhaust passage in which direction the opening of the slit is narrowed].

5. (Amended) A process apparatus including an airtight process vessel, an exhaust system for exhausting gas from the process vessel, and a baffle plate for partitioning the process vessel into a process chamber for processing an object and an exhaust passage communicating with the exhaust system,

wherein the baffle plate [has] includes a plurality of slits through which the process chamber and the exhaust passage communicate with each other[;],

[wherein each slit has a tapered surface on an inner surface toward the process chamber, the tapered surface being formed to not less than 1/4 of a depth of the slit; and]

wherein each slit [has] includes an exhaust-passage opening facing the exhaust passage and a process-chamber opening facing the process chamber,

wherein said process-chamber opening includes a tapered inner surface, said tapered inner surface of the process-chamber opening formed not more than 1/2 of the thickness of the baffle plate, and

wherein said exhaust-passage opening includes an inner surface that is substantially perpendicular to the surface of the baffle plate, said inner surface of the exhaust-passage opening formed not more than 1/2 of the thickness of the baffle plate

[an enlarged opening facing the exhaust passage, the enlarged opening extending from an opening rim of the slit, which faces the exhaust passage, toward the process chamber and having an inside diameter which is larger than a minimum inside diameter of a process-chamber-side portion of the slit on which the tapered surface is formed.]

6. (Amended) The process apparatus according to claim 5, wherein the inner tapered surface of the process-chamber opening and the [enlarged] inner surface of the exhaust-passage opening are formed to having depths not less than 1/4 [to 1/2] of the [depth of the slit] thickness of the baffle plate.

8. (Amended) The process apparatus according to claim 5, wherein each slit extends in a radial direction of the baffle plate, [and the tapered surface extends in the radial direction of the baffle plate,] and the inner tapered surface of the process-chamber opening slopes [extends in the radial direction of the baffle plate on either side of the slit and inclines] from an opening rim of the slit, which faces the process chamber, toward the exhaust passage in which direction the opening of the slit is narrowed.

9. (Amended) The process apparatus according to claim 8, wherein the [enlarged] exhaust-passage opening and the [process-chamber-side portion of the slit where the tapered surface is formed] process-chamber opening communicate with each other through a passage having a [same] diameter which is not larger than the minimum diameter of the process-chamber opening that is [section and size as those of a region] surrounded by an inner rim of the tapered surface.

10. (Amended) The process apparatus according to claim 5, wherein for each slit an angle θ formed between the tapered surface and [a] an axis perpendicular [crossing an open end] to the openings of the slit [at right angles] falls within a range from 5° to 30° [$(5^\circ \leq \theta \leq 30^\circ)$].

11. (Amended) The process apparatus according to claim 5, wherein [a] the width W1 of the process-chamber opening [an opening of the slit, which faces the process chamber,] and [a] the width W2 of the exhaust-passage opening [an opening of the slit, which faces the exhaust passage,] are set as to satisfy a condition of $1 \leq W2/W1 \leq 1.4$.